

Chapter 3: Safety

Chapter Challenge p. 256

16 4 Physics terms  
(used correctly)

4/19

20 Physical model + 2 ea more

15 written <sup>and</sup>/or multi-media report

24 presentation (5 min)

85 pts total

Passenger Car (5/3/11)

Race Car

10 → Why our safety system  
is better than  
current  
safety measures?

Present  
5/12/11  
18

### 3.2 Newton's First Law of Motion: Life and Death before and after Seatbelts

p. 266

4/20

WDYS

A blue and red car. Big crash one dummy flew out of the car (red) dummy on blue car had a seat belt. Shoe of dummy in red car came off, he also broke the car dummy (blue car) had 2 seat belts.

WDYT

It has to be stronger in case of an accident it will be able to restrain the passenger. Better material have it attach in many different parts (more belts) Make the belt wider.

### 3.3 Energy and Work: Why Airbags? p. 277

4/25

#### WDYS

A red car and green car crash into each other. Red car occupant is wearing a seat belt, green car no. Red car has airbag, green car doesn't. Observer looking at red car is pleased, other observer is disappointed. Green car driver hit windshield and sees stars. Both speeding cars have equal damage.

#### WDYT

They protect the passenger from hitting harder stuff when in an accident by not squishing all the way flat and pushes person back. keeps you from going forward...



# What to do in 3.3

- Take notes on Physics Talk
- Sample Problem p. 286
- Checking up #1-4 p. 287
- Read p. 289
- Physics to Go #1, 2, 6, 10

$$\begin{aligned}
 12000 &= \frac{1}{2} \cdot 45 \text{ m}^2 \\
 \frac{12000}{22.5} &= \frac{22.5 \text{ m}^2}{22.5} \\
 \sqrt{533.33} &= \sqrt{\text{m}^2} \\
 23.1 &= \text{m/s}
 \end{aligned}$$

$$\text{Work} = F \cdot d$$

inverse relationship  
 ↓ ↑ flour  
 ↑ ↓ table

$$\begin{aligned}
 KE &= \frac{1}{2} \cdot m \cdot v^2 \\
 (\text{J}) & \quad (\text{kg}) \quad \left(\frac{\text{m}}{\text{s}}\right)^2
 \end{aligned}$$

$$2KE = mv^2$$

$$\frac{2KE}{m} = v^2 \quad \sqrt{\frac{2KE}{m}} = v$$

### 3.4 Newton's Second Law of Motion:

p. 292

4/28

#### The Rear-end Collision

##### WDYS

A crash test-A red car was crashed from the back by a big truck. Red car is damaged, truck is not. The dummy's head is going back and forth because of the impact. The bigger the car is the greater the damage it can cause because it has a greater mass and force but doesn't mean it is safer

##### WDYT

Whiplash is a neck injury. (muscular) it can be spinal

Because the hit is unexpected  
The neck has more travel backward than forward.

### 3.5 Momentum: Concentrating on Collisions p. 304

5/2

**WDYS**- A big truck and a little go cart. The little go cart  
Smash to the big truck and nothing happens to the big truck.  
The truck driver did not notice. The go cart went  
up in the air.

**WDYT** Speed, The mass of the vehicle, a seat belt, the  
air bag, the material the car is made of, bumpers,  
The size of the car.

The size of the smaller car has greater acceleration  
on him.

p. 307  
CU 1-3

p. 309  
PlG #1-7



## WDYS

A roller coaster cart going down. Starts out fast then slows down and pushes a cart in front of it. A boy is timing the cart and the girl takes notes. They measure distance traveled after collision. The carts stick together.

## WDYT

Newton's first law, Second law.

Kinetic energy, work, friction.

Momentum

Conservation of energy.

$$p = m \cdot v$$

p. 315

pp. 319-320

CU 1-3

Pt 4 #3, 6, 9

### 3.7 Impulse and Changes in Momentum: p. 321

#### Crumple Zone

5/11

#### WDYS

A dummy taking notes - observing dummy in the car dummy in car going at a high speed. On the front of the dummy's car are spring feet that will stop him when he collides into the block

#### WDYT

- materials of the car  
the distance to crumple  
Other safety devices in the car  
and the speeds of the cars / the mass  
of the car size of the car and the shape  
of the car and the tires

5/12



# COM - Center of mass

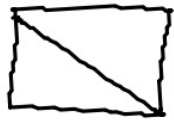
5/13

mm



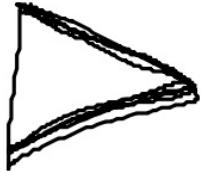
Didn't Work

No energy abs.



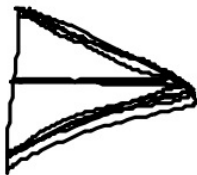
Didn't Work

Not enough energy absorbed



Didn't Work

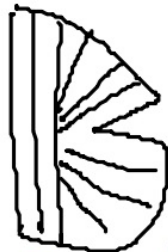
Too rigid



Didn't work

Way too rigid

mm



flexible

WORKED!

absorbed energy

more rigid but deformed

**5/16 Chapter Challenge Work Day**

**5/17 Chapter Challenge Present**

**5/18 Chapter 3 Test**

**5/19 Final Review**

**5/20 Final Review**

**5/25 Final (11:00)**